

DocScan



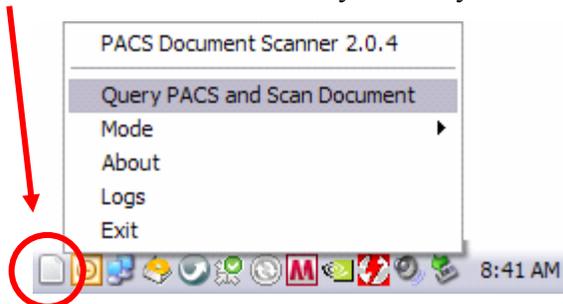
PACS Document Scanner
Current Version: 2.0.7

Purpose:

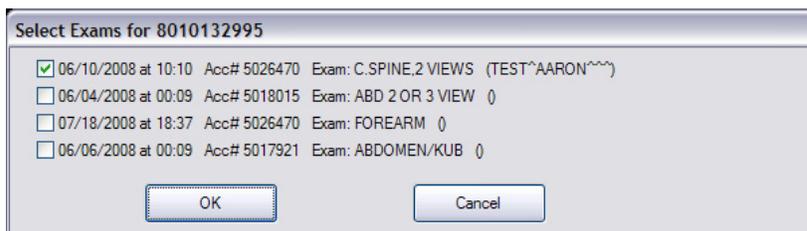
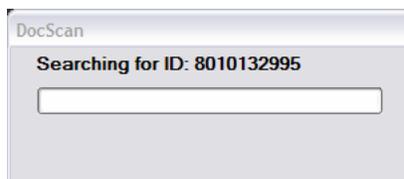
DocScan is a document scanning program for converting paper documents and image files to DICOM objects and importing them into PACS. DocScan incorporates “modes” which are profiles for how a scanned document should be converted and sent to PACS. DocScan supports archive queries and modality worklist queries for sending exams to PACS. DocScan should work with any TWAIN compliant scanner and also supports the Fujitsu ScanSnap S510 (non-TWAIN compliant) page fed scanner.

Workflow:

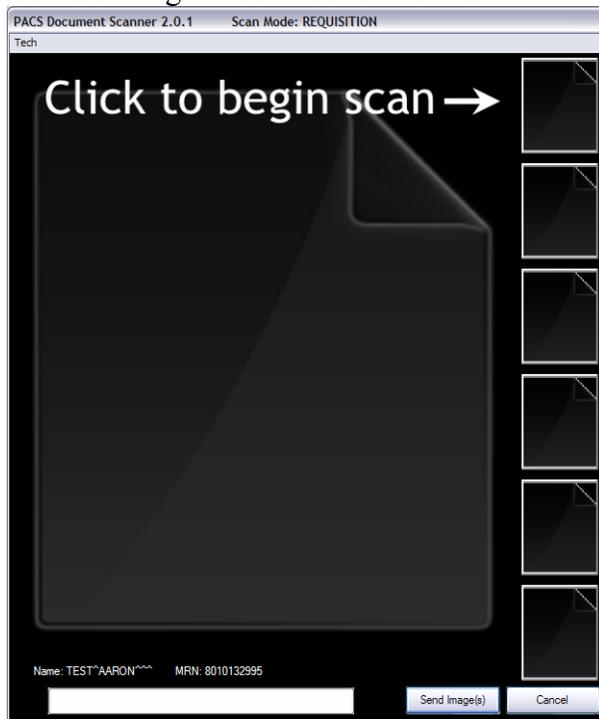
DocScan can either be integrated with Emageon PACS (via shortcut key, viewport button, context or system menu) or used as a standalone product. Changing modes or launching in standalone is done with the DocScan icon located in the system tray:



DocScan can send the same scanned documents to multiple studies by presenting the end user with a check list of query matches:



The DocScan scanning window looks like this:



Clicking one of the thumbnail buttons starts the scanning. Depending on your INI file settings, your user may be presented with an option to scan a single page or multiple pages. In the end, the large portion of the window will display the scanned document with the thumbnail image(s) down the side:



After an initial scan you can click any of the empty thumbnails to scan in more documents.

There are six thumbnail placeholders down the right side of the DocScan window which have the following context menu options for manipulating the images they represent:



Delete: Removes the image

Import: Lets the user browse for BMP or JPG files to import instead of scanning images.

Rotate 180: Rotates the image 180 degrees incase it was scanned upside down.

Invert Image: Makes a negative of the original image.

Convert to grayscale: Converts a color image to grayscale.

Edit image in IrfanView: This option lets the user have full access to the image editing options in IrfanView. There are a wide range of cropping, filtering and image enhancement options in Irfanview. Be sure to save the picture with the File -> Save option before exiting IrfanView so that the image gets updated in DocScan.

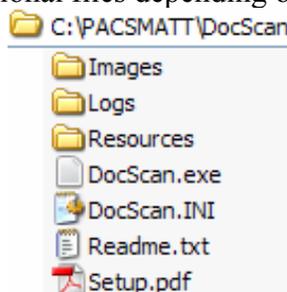
(Note: You have the option of removing any context menu options you don't want on a per mode basis.)

Currently, DocScan only supports 6 images per document scanning session. If you load 7 pages in your scanner, DocScan will ignore the 7th page. In developing this tool for my site, it was rare that we needed to import more than six documents at a time so I limited it to that. In a future release I plan to add an option to expand the number of thumbnail buttons if more are needed.

Setup:

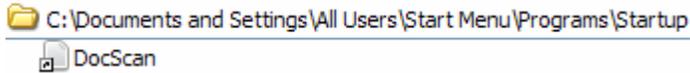
(Note: I have not created an installer for DocScan yet because I am adding features into the program at a rate faster than I currently want to spend time recreating setups for it. When the development cycle slows down I will create an installer that performs the following steps for you. Until then here are the steps to manually perform the install.)

- 1) Download DocScan from <http://www.pacsmatt.com/programs/DocScan/DocScan.htm>.
- 2) Unzip the file to the C: drive. You should end up with the following folder structure (and some additional files depending on what's in the latest release):



(Note: You should be able to install DocScan to a different folder, however I have not tested this.)

- 3) Make a shortcut to the DocScan.exe file and place this shortcut in the All Users Startup folder:



- 4) All the settings for DocScan are contained in the DocScan.INI configuration file which you must modify before using DocScan. Here is the DocScan.INI file included in the zip file. At a minimum you must modify the highlighted items in order to get DocScan working with your PACS. There are many more options to configure to make DocScan more useful so be sure to reference the “DocScan INI Options” section, later in this document.

DocScan.INI file:

[TECHS] John Jingle JJ= Mary Ray MR= Other Tech OT=	<i>Operator initials can be added to an exam via a drop down list. At least one tech must be listed in this section. Tech initials can be optional or required. Each line must end with an =.</i>
[COMMON] PACSARCHIVEAE=PACS_SCP PACSARCHIVEIP=10.20.30.40 PACSARCHIVEPORT=104 PACSMWLAE=PACS_MWL PACSMWIP=10.20.30.41 PACSMWLPORT=5004 CallingAETitle=DOCSCAN	<i>Fill in the values for your PACS archive and modality worklist server AE title, IP address, and port number.</i> <i>The AE title DocScan will appear as to your PACS.</i>
[MODES] WORKSHEET=	<i>This is a list of Modes you want available in DocScan. Each must end with an =. There must be a corresponding section with the same name for each Mode that is listed here.</i>
[WORKSHEET] MODE=/gray SERIES=999 SERIESDESCRIPTION=Worksheet SCANPAGE=SINGLE InstitutionName=Hospital Name QueryType=Archive DaysToQueryPACS=2	<i>Specific settings for "WORKSHEET" mode: Converts the image to grayscale. Series number to apply to the image. Series description for the image. Puts DocScan in single page mode. Institution name added to DICOM header. DocScan will query the PACS archive. Number of days DocScan will search PACS for the queried study (based on MRN).</i>

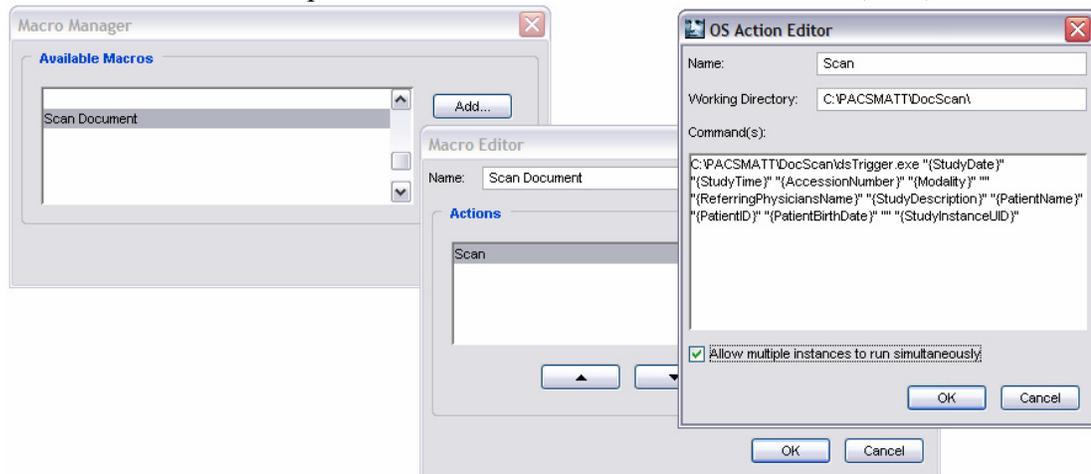
5) (Optional, but nice!) Here is how to integrate DocScan into the Emageon PACS viewport interface. Do this to your user's inheritance account so that you only have to set it up once and not on each individual user account.

- a. After you have performed the above steps, run Emageon PACS and go to File -> Preferences -> Macro Manager
- b. Click Add, name the Macro "Scan Document" and click OK.
- c. Click Add again, choose "New OS Action" and click OK.
- d. Name the OS Action "Scan" and leave the Working Directory blank.
- e. Copy and paste the following text into the Command(s) field:

```
C:\PACSMATT\DocScan\dsTrigger.exe "{StudyDate}" "{StudyTime}"
"{AccessionNumber}" "{Modality}" "" "{ReferringPhysiciansName}"
"{StudyDescription}" "{PatientName}" "{PatientID}" "{PatientBirthDate}"
"" "{StudyInstanceUID}"
```

(Note: DocScan will not function correctly if this text is not copied exactly.)

- f. Leave the "Allow multiple instances..." box checked and click OK, OK, & Close.

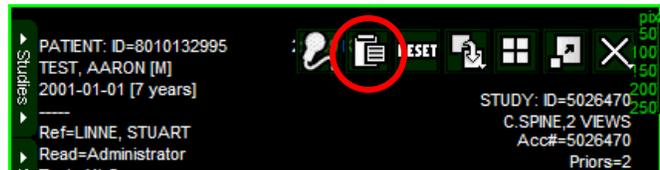
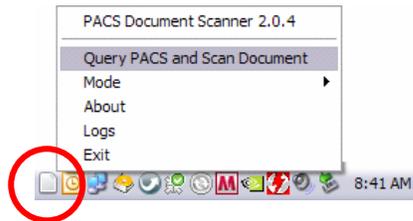


- g. The *dsTrigger.exe* file is used to pass exam demographics to the DocScan application.
- h. Now add a method for your user to launch this macro. This could be a shortcut key, context or application menu option, or a viewport button. I will describe how to add a viewport button, modify this as needed if you want a different method.
- i. Go to File -> Preferences -> Customize Image Display user Interface
- j. Click the "Secondary Toolbar" tab and click the Add button.
- k. Choose "Macro: Scan Document" from the list and click OK.
- l. Click the new "Scan Document" option in the button list and choose Edit.
- m. Choose an icon (I like the clipboard icon for DocScan) and click OK.
- n. Use the arrow buttons to move the new button to where you want it and click OK.
- o. To enable Emageon PACS integration, be sure that the DocScan.INI file has the following option in the [COMMON} section: **MACROINTEGRATED=YES**

6) DocScan uses the program IrfanView to do the actual document scanning with TWAIN devices. I find you have to manually do one scan with IrfanView before DocScan is able to use the scanning device. Follow these steps:

- a. Browse to C:\PACSMATT\DocScan\Resources \IrfanView and run the *i_view32.exe* file.
- b. Click File -> Select TWAIN source, choose your scanner and click the Select button.

- c. Click File -> Acquire/Batch Scanning,
 - d. Choose the “Single image...” option, click OK and follow your scanners steps to scan any test document you want.
 - e. Discard the scanned image and close IrfanView.
- 7) That should do it. Run DocScan by double clicking the DocScan.exe file (it will launch automatically in the future because of step #3). Test out DocScan by either by clicking its system tray icon and clicking “Query PACS and Scan Document” or use the PACS integrated button.



Adding More Modes:

The initial DocScan.INI file only has one mode. Try adding the following changes to your configuration to add more function:

```
[MODES]
WORKSHEET=
REQUISITION=

[WORKSHEET]
MODE=/gray
SERIES=999
SERIEDESCRIPTION=Worksheet
SCANPAGE=SINGLE
InstitutionName=Hospital Name
QueryType=Archive
DaysToQueryPACS=2

[REQUISITION]
MODE=/gray /invert
SETMODALITY=OT
SERIES=100
SERIEDESCRIPTION=Scanned Requisition
INITIALPROMPT=YES
SCANPAGE=MULTIPLE
MultiPagePromptDelay=5000
InstitutionName=General Hospital
DaysToQueryPACS=3
QueryType=ARCHIVE
StackImagesInSeries=FALSE
```

This new “Requisition” mode will:

- Convert scanned documents to grayscale and invert the black & white.
- Force the modality to be OT.
- Set the series number in PACS to be 100.
- Set the series description to “Scanned Requisition”
- Force the user to select their initials from the Tech drop down menu.

- Sets DocScan to use a page fed scanner so it can import more than one document at a time.
- Sets the delay before the user sees the multi-page confirmation prompt (see the “DocScan INI Options” section for more details).
- Sets the DICOM header InstitutionName to “General Hospital”.
- Queries PACS for three days worth of studies that the scanned documents might need to be attached to.
- Performs an archive query, e.g., it is searching for existing exams (images) in PACS to attach the scanned documents to.
- Multiple scanned images will be in unique series, beginning with 100 (because we set it as that) and counting forward by one: 100, 101, 102, etc.

Notes:

- Remember that for each mode section you add, e.g., [REQUISITION], there must be a corresponding entry in the [MODES] section, e.g., REQUISITION=.
- You can have as many modes as you need. So be creative. (Ok, there is some limit to the total number of modes. I don’t know what it is). You need to exit DocScan and restart it whenever you make changes to the MODES section of the INI file.

DocScan.INI Options:

Here is a complete list of the options you can configure in DocScan.

“**Section**” is the part of the DocScan.INI that the setting applies to.

“**Option**” is the option you are configuring (how else do I describe that?)

“**Default Value**” is the value applied if you do not set the option at all.

“**Notes**” are notes.

Section	Option	Default Value	Notes
[TECHS]	variable Format example: Mike Jones MJ=	Do not enter a value after the equal sign	At least one value must be in this section for DocScan to run and each line must end with an equal sign. That’s a pipe () symbol in between the name and initials.
[COMMON]	PACSARCHIVEAE	None	Your PACS DICOM SCP AE title. (Required)
	PACSARCHIVEIP	None	Your PACS IP address. (Required)
	PACSARCHIVEPORT	None	Your PACS port number. (Required)
	PACSMWLAE	None	Your PACS DICOM Modality Worklist AE title. (Required)
	PACSMWIP	None	Your PACS DICOM Modality Worklist IP address. (Required)
	PACSMWLPORT	None	Your PACS DICOM Modality Worklist port number. (Required)
	CallingAETitle	DOCSCAN	Change the calling AE title if you want to.
	MACROINTEGRATED	NO	Either YES or NO. Decides if DocScan is integrated with Emageon PACS. “YES” will cause it to watch for prompts from the macro launching the dsTrigger.exe program.
	IMAGEDIR	\DocScan\Images	This folder holds the scanned images

			before they are converted to DICOM objects.
	RevertScanModeToFirstChoice	0	<p>When there are multiple modes available in DocScan, this choice decides when DocScan will revert back to the primary mode (which is the first one listed in the modes section).</p> <p>Setting this to zero, forces DocScan to revert to the first mode after every scan. This is useful in an environment where users are expecting DocScan to be in a certain mode, but there are may be infrequent occasions where users will need to scan in an alternative mode.</p> <p>You can also set this value to a number of minutes that you want DocScan to wait before reverting to the primary mode. 1 = 1 minute wait 5 = 5 minute wait 0.3 = 18 second wait</p> <p>If you don't want it to revert, then set this to some arbitrarily high number like 20160 which 2 weeks.</p>
	DebugMode	FALSE	Set to TRUE or FALSE. This will create detailed log files in \DocScan\Logs for troubleshooting. They are full of patient data so don't leave this on after you work out the kinks and be sure to delete old files.
[MODES]	variable Format examples: REQUISITION= SCANNED DOCUMENT= MAMMO WORKSHEET= DEXA=	None	You must have at least one Mode specified in this section and each mode line must end with an equal sign.
[SpecificMode]	Note: there is no section called "SpecifiedMode". I am referring to options in each of the Mode specific sections like [REQUISITION] or [SCANNED DOCUMENT]		
	MODE	/gray /invert	<p>This is a setting for image conversion options that you want automatically applied to every image that is scanned in that mode. If you don't specify this option the document will default to grayscale and inverted black/white. If you don't like the default, use one of the options below and stop griping – this program is free for goodness sake: Use MODE= with nothing after the equal sign to leave the document in the format the scanner scanned it in. Use MODE=/gray to just convert to gray. Use MODE=/invert to make a negative of the image. These options are applied during</p>

			DocScan's command line image conversion using i_view32.exe. There are many more options you could explore and apply here to automatically do some conversion to your images. Read the "Command Line Options" section of the i_view32.chm help file located in \DocScan\Resources\IrfanView for more details.
	SETMODALITY	CHECK	Set to CHECK, or a particular modality you want to set the scanned images to. CHECK will set the modality to be the same as whatever the queried study modality was, i.e., initiate DocScan in Emageon PACS from a CR study and the scanned document will show up as a CR image as well. At the moment, CHECK only works with Emageon PACS integrations and modality worklist queries. CHECK use with archive queries initiated from the DocScan icon will be added in a future release.
	ModalityOptions	CR DR XR US MR CT OT PT MG NM XA RF CHECK	This is the allowed list of modalities. If you need to modify this list make sure it is a string of the modalities you want to allow scanned documents to go to PACS as separated with the pipe symbol ().
	ModalityDefault	OT	The default modality that DocScan uses if the selected modality is not on the ModalityOptions list or CHECK fails to establish a unique modality.
	SERIES	99999	The series number that you want the scanned documents to be assigned.
	SERIESDESCRIPTION	Defaults to the PACS Study Description.	
	ModPrompt	NO	YES or NO. DocScan can prompt the end user with a question hen they click the send button. The question can be modified with the ModQuestion option. This feature is in place in case you have a workflow need to make a minor change to a submitted scanned document's series number. In our case, we used this to ask techs if the exam was eligible for sending to a third party reading service or not. If they answered yes to the question, then the series number was changed to the value in the ModSeriesTo option. This allowed us to have an extra PACS exam list based on the modified series number to show exams that were ready to be sent to the third party reading service.
	ModQuestion	"Use modified exam	This is the question the end user is

		series number?"	prompted with if the ModPrompt option is set to YES. This option is ignored if STATPROMPT is on and the user answers YES.
	ModSeriesTo	99099	The series number the exam is given if the end user answers YES to the ModQuestion.
	INITIALPROMPT	NO	YES or NO. Decides if the end user is required to choose tech initials from the DocScan Tech drop down menu.
	STATPROMPT	NO	YES or NO. If YES, after the user clicks send they will be asked if the exam is a STAT exam or not. DICOM tag (0032, 000C) "Study Status" is then modified to either LOW, MEDIUM or HIGH. It is set to LOW by default, MEDIUM if the user answers YES, and HIGH if the follow up option STATPROMPTRED is equal to YES. The end result of this is that the exam gets marked as STAT in Emageon PACS – the same as using the "Priority" function in PACS and setting the exam to Medium or High.
	STATPROMPTRED	NO	YES or NO. If YES, the end user will be asked "Is this a 'RED' STAT Exam?", otherwise, they will not receive this prompt. If they answer NO, the exam will remain in Medium level priority (stat status).
	ImportOnlyMode	FALSE	TRUE or FALSE. Set to TRUE if you want the default action of the thumbnail button to be to import files instead of using a scanner. Use this option for situations where DocScan (or a particular mode) is only needed for importing images.
	SCANPAGE	PROMPT	Either SINGLE, MULTIPLE, or PROMPT. PROMPT will ask the user if they want to scan a single page or multiple pages (I'm not sure if anyone would want this mode). SINGLE puts DocScan in single page mode where DocScan is only expecting to receive one page from the document scanner. Use this for flatbed page scanners. Do not use this option with page fed scanners unless you will never scan more than one page at a time. MULTIPLE is obviously for multi-page scanning. Because of an inconsistency in how scanners report they are done scanning multiple pages, DocScan needs a user confirmation when the scanner is done scanning. In this mode, DocScan will pop up a message telling the user to "Click OK

			when the scanner has completed scanning all the pages”. The message appears based on the value of <code>MultiPagePromptDelay</code> .
	<code>MultiPagePromptDelay</code>	8000	Number of milliseconds to wait before showing the end user the message to click ok when the scanner is done scanning multiple pages. It is important to delay this message or users tend to click on it too soon. Try to pick a value that will cause the message to appear after a typical number of pages are scanned. For instance, we use this mode for our CT scanner where they typically scan in 5 documents. This takes around 8 seconds, so we set this value to 6000 so that the message appears right before the scanner is done scanning and the user isn't sitting around waiting for a message to appear so they can proceed.
	<code>ScanInterface</code>	hidden	This value is passed to <code>i_view32.exe</code> when a scan is being performed. Some scanners allow you to hide their scanner interface so the end user is not prompted to make scan option choices from the TWAIN software. If you want the scanner interface to appear set this option to just be: <code>ScanInterface=</code> with nothing after the equal sign.
	<code>NoModFinalPrompt</code>	beep	A message can be displayed to the end user after the images have been sent to PACS. This particular value is specific to images in which the <code>ModPrompt</code> value was NO or the end user clicked NO when prompted to modify the series number. If this value is in the INI and equal to anything other than “beep”, DocScan will display the text that this value is equal to as a message the user must click OK on. Use this if you need to give any final instructions to the user. Otherwise, DocScan will just give a confirmation beep.
	<code>ModFinalPrompt</code>	beep	You can deliver a different message to the end user if <code>ModPrompt</code> is enabled and the user clicks YES to the prompt. Use this if you need to provide different instructions to the user for cases where the series number gets modified.
	<code>InstitutionName</code>	PACSMATT	Better change this one or your organization will appear to be “PACSMATT” in the DICOM header.
	<code>DefaultImportDir</code>	The user's desktop	This is the path to the folder that DocScan should open first when

			browsing for images to import.
	DeleteImageAfterImport	FALSE	TRUE or FALSE: Deletes original imported images upon successful send to PACS.
	PrePopulateFromImageImportDir	FALSE	TRUE or FALSE: DocScan will look for existing images in the DefaultImportDir and import up to six images with no user intervention.
	EmptyImageFolderOption	FALSE	TRUE or FALSE: Adds a tray menu option to allow the user to empty the folder specified in DefaultImportDir.
	DaysToQueryPACS	0	This is the number of days an archive or modality worklist query will look in PACS for other exams that match the patient's ID number. When set to zero, DocScan will not attempt to search for other exams (only use this with PACS integrations). Set this to any whole number that represents the number of days back you might want to attach the scanned documents to. Pick a number that will narrow the list of choices as much as possible. For instance, if you are using DocScan to scan in requisitions, you probably only need this value to be 2 days because scanning a requisitions should happen right after the exam is complete (and setting it to 2 days lets it find exams that cross the midnight time frame). Other workflows may require higher values like a clerk adding a worksheet to an exam possibly days after the exam was performed.
	QueryType	ARCHIVE	Either ARCHIVE or WORKLIST. When set to ARCHIVE, DocScan is searching for existing PACS exams in your PACS archive and the scanned documents will be attached to those exams. When set to WORKLIST, DocScan will query your worklist for scheduled exams and it will use the worklist responses to populate the exam details. In general, use ARCHIVE whenever you need to attach scanned documents to existing exams in PACS and use WORKLIST when the scanned documents are the entire exam (perhaps DEXAs or certain vascular US studies?). The trouble with using WORKLIST to attach exams to existing studies in PACS is that some modalities ignore the StudyInstanceUID value that the modality worklist provides and they generate their own. Your scanned documents will not attach to these studies because DocScan will use the

			worklist's StudyInstanceUID instead.
	RestrictContextOptions	NONE	<p>This allows you to restrict what context menu options are available with the thumbnail buttons in DocScan (when you right click on these buttons). Set this value to any context items you do NOT want to appear to the end user. For example:</p> <pre>RestrictContextOptions= IMPORT EDIT INVERT</pre> <p>This would remove the context options for Importing images, editing images, and inverting them.</p> <p>Separate any restricted options with commas, spaces or pipe symbols (). You can restrict IMPORT, ROTATE, INVERT, GRAY, & EDIT, but not DELETE.</p>
	StackImagesInSeries	TRUE	<p>TRUE or FALSE. When set to TRUE, multiple images scanned (or imported) with DocScan will be sent to PACS in a single series with incrementing instance numbers. When set to FALSE, there will be one image per series and the series number will increase in value by one for each new series (the first series number is still the value in SERIES) .</p>
	SleepDelayMod	1	<p>Some slower PCs may need to increase this value to give DocScan more time to process images. You should not need to modify this value (I have never seen a need to). However, if you find DocScan is forming corrupted DICOM objects, increase this value to 1.5 or 2.</p>
	CropTop	0	<p>Specify a value from 0 to 0.10 representing the percentage (0 to 10%) of the top of the image that you want automatically removed.</p>
	CropBottom	0	<p>Specify a value from 0 to 0.50 representing the percentage (0 to 50%) of the bottom of the image that you want automatically removed.</p>
	CropSides	0	<p>Specify a value from 0 to 0.10 representing the percentage (0 to 10%) of the sides (both sides) of the image that you want automatically removed.</p>
	CorrectEmageonIntegrated MacroValues (all one word)	TRUE	<p>TRUE or FALSE. When DocScan is run through the Emageon macro integration, Emageon will pass a formatted name (Smith, Jane) to DocScan instead of the DICOM format (Smith^Jane^^). DocScan will convert these back to the correct format before sending new images to PACS. When this option is set to TRUE, DocScan will compare the converted name format to how it</p>

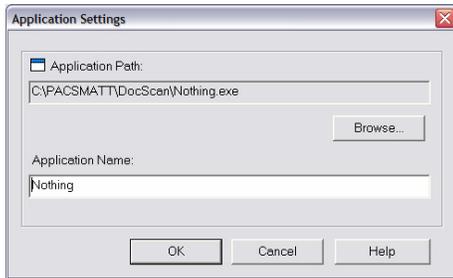
			appears in any other same patient ID exams that the query responds with and that the end user selects. If the name format differs, DocScan will use the name format from the queried response instead of the converted format from the Emageon integration.
	The following two values are specific to using the Fujitsu ScanSnap S510 page fed scanner with DocScan:		
	SCANPAGE=S510		Setting SCANPAGE=S510 allows DocScan to use the Fujitsu ScanSnap S510 non-TWAIN compliant scanner. There are some additional files that need to be installed as well. Please refer to the “Configuring DocScan for the Fujitsu ScanSnap S510” section.
	S510TIMEOUT	20	This is the number of seconds that DocScan monitors the S510’s image directory for new images. If the images have not been scanned within this timeframe, DocScan assumes no images were scanned at all.

Configuring DocScan for the Fujitsu ScanSnap S510:

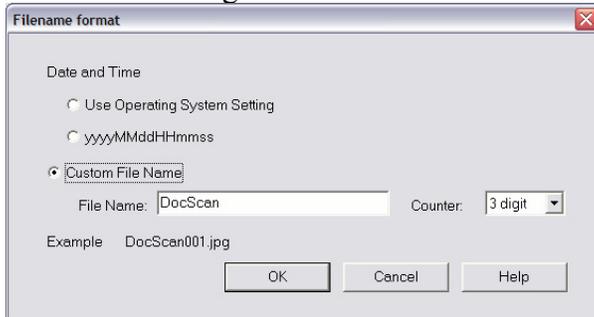
I bought a bunch of Fujitsu ScanSnap S510 document scanners assuming they were TWAIN compliant. Assumptions... Really, how can a manufacturer be making a non-TWAIN compliant scanner these days? Doesn't that sound very 1990's? Anyways, I was rather annoyed when I got these scanners and realized they would not work with DocScan, but instead of sending them back, I decided to make them work. They actually work very well. In fact, we have replaced almost all our scanners with these S510s and I love them now. So here's how to setup this Fujitsu scanner:

- 1) Install the Fujitsu software that comes with the scanner. You only need to install the ScanSnap Manager and not the other two programs (unless you want them). I wrote these instructions version 4.1 of SnapScan Manager.
- 2) Restart the computer as the installer recommends. Make sure your scanner is all plugged in and turned on. If everything is going well there will be this icon in your system tray:  There is a problem if you see this icon: 
- 3) Double click the  icon.
- 4) On the “Application” tab, click the “Add Profile” button. Name the profile “DocScan” and click OK.
- 5) Click the “Add or Remove” button -> Click the “Add” button -> Select **C:\PACSMATT\DocScan\Nothing.exe** for the Application Path-> Type “Nothing” for the

Application Name -> click OK -> click Close.



- 6) Go to the “Save” tab and set the “Image saving folder” to **C : \PACSMATT\DocScan\Images**.
- 7) Click the “File name format” button -> choose “Custom File Name” -> set this to “DocScan” -> set the Counter to “3 digit”.



- 8) Click the “Scanning” tab -> Choose your “Image quality” setting (I recommend Normal) -> Set Color mode to “Color” (DocScan will convert to grayscale if desired) -> Set “Scanning Side” to Simplex or Duplex (depending on what you need) -> Make sure “Continue scanning after current scan is finished” is unchecked.
- 9) Click the “Options” button and uncheck all the boxes.
- 10) Click the “File option” tab -> Set the “File Format” to JPEG.
- 11) Click the “Compression” tab -> Choose a compression rate (I use ‘LOW’ because the image will be uncompressed anyways as it is transformed to a DICOM object in Explicit Little Endian transfer syntax.)
- 12) Click OK to exit.
- 13) These changes are saved in the following two folders:

C : \Documents and Settings\Logged in user's name\Application Data\Fujitsu

C : \Documents and Settings\Logged in user's name\Application Data\PFU

As you can tell, these settings are user specific. To avoid setting this up for every user you have on a particular PC, copy these two folders and paste them into each existing user's “Application Data” folder in **C : \Documents and Settings**. Also, make sure you copy these same two folders into the **C : \Documents and Settings\Default User\Application Data** folder so that new users will inherit these settings appropriately. You can also copy these folders to other computers that you set up Fujitsu S510s. You might want to wait to copy these settings to other users/PCs until you have tested that the settings are working correctly.

- 14) Make sure the **SCANPAGE** value in the DocScan.INI file is set to **S510**.
- 15) Add/adjust the **S510TIMEOUT** value in the DocScan.INI file to reflect the number of seconds DocScan should wait for the scanner to finish scanning images. DocScan is watching for the images to appear during this timeframe and will terminate waiting as soon as it sees the images appear from the scanner. This timeout value is only invoked when no images are seen from the scanner in that timeframe and DocScan then assumes that no images were scanned at all.

- 16) Test out DocScan! When you click the thumbnail to scan an image, some green text will appear informing you to press the Fujitsu scanner's "Scan" button". After the scan is complete the images should appear in the thumbnails.

Known Issues:

- 1) Let me know what you find!

Future Enhancements:

- 1) Increase the number of available thumbnail buttons so more than 6 images can be scanned at a time.
- 2) Ability to use CHECK option to discover modality for standalone archive queries. This is an issue because the archive query will send back all the modalities that are in the study. This could include PS, SR, OT, mixed CR/MR, CR/CT, etc. It's difficult to try and guess which one is the primary modality. I plan to fix this by having a preferred list of modalities which could be used to exclude unwanted types like PS and SR. Evaluating mixed modalities like a combo MR/CR case would be accomplished by choosing the modality that had the highest count in the study and in a narrow margin of difference, by the order of the modalities in the preferred list.
- 3) Add MANUAL option to QueryType which would not do a query at all. It would prompt the end user to fill in all the required fields in order to submit the study to PACS.
- 4) Add option to query PACS by accession number instead of patient ID.
- 5) Any ideas?

License Statement:

This program (DocScan.exe & dsTrigger.exe) may be used and/or redistributed freely, provided you give me due credit and let me know how you are using it.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

Emageon, Inc. is not involved with the development of DocScan and therefore would not be able to answer questions about it or provide technical support for it.

You have not purchased this program. Test it, evaluate it, and decide for yourself if it accomplishes what you need. If you need something different or want a program for which you can hold someone accountable for its function then purchase a different program that meets your needs. Otherwise, please enjoy using DocScan

Version History:

- Version 2.0.7
 - Update feature via "about" tray menu option

- Fixed image resizing problem
- Added log time stamps to DICOM file creation
- Files are resized to compliant size before conversion
- Fixed error with EmptyImageFolderOption=FALSE
- Version 2.0.6
 - Remove +CA mod during image conversion
- Version 2.0.5
 - Added Instance Creation Date (0008,0012) and Instance Creation Time (0008,0013) tags
 - Fixed problem with disabled controls when cancelling the option to import images.
 - Added INI mode option for ImportOnlyMode=TRUE/FALSE for situations where DocScan will only be used for importing image files. This makes the default action of the thumbnail buttons be to import an image.
 - Can import bmp, gif, jpg, jpeg, png, & tif graphic files now
 - Can select multiple images when importing graphic files.
 - Added INI option DeleteImageAfterImport = TRUE or FALSE. Will delete all import images upon successful SEND to PACS.
 - Multiple imported images will be imported in ascending filename order
 - EmptyImageFolderOption INI option (TRUE or FALSE) to add tray menu item for offering to delete the Image Import folder of image files. If no folder is specified for a mode, no delete will be performed.
 - PrePopulateFromImageImportDir INI mode option (TRUE or FALSE) causes DocScan to look for existing images in the DefaultImportDir and inserts those images into the DocScan window with no user intervention.
- Version 2.0.4
 - Removed encrypted log of docs sent to PACS - logs are only available in DEBUG mode now.
 - Combined DICOM sends for multiple images to one association (separate associations are still in place for same images to multiple studies)
 - Changed format of DEBUG log for easier viewing.
 - Added full image tooltip to display what exams the images are going to be sent to.
 - When archive of WL query selected choices are > 1 and if DocScan was started from an Emageon integration, then DocScan verifies the name was correctly "unconverted" by comparing it to the 2nd queried choice.
 - Fixed code for unstacking multiple documents, series numbers now increment by 1 for each new series.
- Version 2.0.3
 - Added StackImagesInSeries INI option - on a per mode basis, image stacking can be either set to TRUE or FALSE
 - Corrected archive & MWL queries so correct calling ae from INI file is used.
 - Added context option for editing image in IrfanView.
 - Moved Log files to Logs folder.
 - New transfer syntax conversion.
 - Added DelayMod INI value for slower PCs.
 - Added archive/MWL queries output to Log folder if in DEBUG mode
 - Added option to remove button context options on a per mode basis.
 - Optimized DICOM Tag modification to occur at DICOM file creation instead of after.
- Version 2.0.2
 - Added button context options to rotate, invert and convert to grayscale.
 - Removed old code for file deletion
 - Added error checking code for modality types.
 - Added ability to default to specified modality.
- Version 2.0.1
 - Ability to import bmp and jpeg files
 - Import and delete are now right click functions of the thumbnail buttons.
 - Moved days to search archive to scan mode type in INI file. (Different search criteria can be used dependant on type of document being scanned)
 - Fixed query results window when results were equal to 0
 - MWL Query
- Version 1.9.0
 - Added in ability to revert scan mode to first item in last after X # of minutes or to revert after every scan (set to 0).
- Version 1.8.8
 - Fixed Stacked scanned series being separated because of @SEC value in StudyUID
 - Added code so DaysToQuery can be zero and it won't search for priors.
 - Embedded workstation IP in Series InstanceUID
- Version 1.8.7
 - Modified format of SeriesInstanceUID to be more in line with regular UIDs
- Version 1.8.6

- Done: Invalid Series Instance UIDs due to _UIshift value having leading zeroes, added the static value 9999900000 to precede the time.
- Done: Added customized Calling AE Title option in INI file for each report type.
- Version 1.8.5
 - DONE: "Sending Message" on screen
 - Done: timeout on process check function
 - Done: Fix code for if scan is cancelled and error checks for whether file was created or not.
 - Done: Change Exit behavior to have confirmation prompt
 - Done: Option to not prompt for Tech initials (use available if present)
 - Done: More granular progress bar on status
 - Done: Add results of jpeg conversion to detailed log file.
 - Done: Added Mode to Title bar
 - Done: Read Image Dir from INI file
 - Done: dsTrigger to launch with macro integration
 - Done: Multi-page scanning
- Version 1.8
 - Updated dsTrigger to Activate DocScan window if it goes to the background and the user relicks the scan button
 - Done: Add ExamMod change
 - Done: Multiple Page prompt delay is now user configurable
- Version 1.8.2
 - Added:Support for custom mod messages
 - Changed confirmation message to delete GUI and provide audio feedback
- Version 1.8.4
 - Supports paging of stats and RED stats
 - Marks exams with MED or HIGH STAT status
 - S510 timeout value is variable in the INI file per mode type
- Version 1.8.5
 - Added "reduce memory" function
 - Removed prior scans feature
- Version 1.7
 - Done: Added support for non-TWAIN compliant Fujitsu S510 document scanner
 - Done: Added support for image cropping by Mode Type with INI values of CROPLENGTH & CROPSTART
 - Done: About window closes after 60 seconds
 - Done: Added Log viewer via tray menu
 - Removed portion of DocScan label that had single exam specific info

Included Third Party Applications:

DocScan uses the following existing third party programs to process the image files. I did my best to make sure it was ok to redistribute these files. If I am in error in distributing any of these files, please let me know.

□ STORESCU.EXE

□ DCMDJPEG.EXE

From the OFFIS DCM Toolkit available at <http://dicom.offis.de/dcmTk>. These files are free from as far as I can tell. The following paragraphs are listed in accordance with their Copyright text for redistribution:

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*

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*

* *Kuratorium OFFIS e.V.*

* *Healthcare Information and Communication Systems*

* *Escherweg 2*

* *D-26121 Oldenburg, Germany*

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□ I_VIEW32.EXE

Irfanview is an excellent graphic file manipulation program that offers command line support for TWAIN enabled scanners. It is available at <http://www.irfanview.com>. Irfanview is free if you meet the author's stated requirements:

"IrfanView is provided as freeware, but only for private, non-commercial use (that means at home). IrfanView is free for educational use (schools, universities and libraries) and for use in charity or humanitarian organisations."

I contacted the author, Irfan Skiljan (irfanview @ gmx . net - remove the spaces) about using and redistributing IrfanView with Docscan and on 12/06/07 he replied:

*"... No problem, you can use IrfanView for this, no costs :-)
The current IrfanView version is 4.10
Greetings/Gruesse/Pozdrav,
Irfan"*

□ JPG2DCM

□ DCMMWL

□ DCMQR

JPG2DCM is part of an open source DICOM toolkit and used to convert the jpeg images to DICOM files. It is available at <http://www.dcm4che.org/confluence/display/d2/dcm4che2+DICOM+Toolkit>. It is free, open-source software. From the website:

"dcm4che2 is a high performance, open source implementation of the DICOM standard."